Contents of Volume 70

Number 1

Research Papers

1 The Ctenophore *Mnemiopsis leidyi* Has a Flow-Through System for Digestion with Three Consecutive Phases of Extracellular Digestion
DIRK BUMANN AND GABRIELA PULS

7 Effect of Temperature on Oxygen Stores during Aerobic Diving in the Freshwater Turtle *Mauremys caspica leprosa*
JOSEP FELIU FUSTER, TERESA PAGÉS, AND LUIS PALACIOS

19 Validation of the Doubly Labeled Water Method in Bald Eagles (*Haliaeetus leucocephalus*) and a Comparison of Two Equations for the Calculation of Energy Expenditure
CHERYL R. DYKSTRA, MICHAEL W. MEYER, AND WILLIAM H. KARASOV

27 The Energy Assimilation Efficiency of Emperor Penguins, *Aptenodytes forsteri*, Fed a Diet of Antarctic Krill, *Euphausia superba*
ROGER KIRKWOOD AND GRAHAM ROBERTSON

33 Seasonal Variations in the Temperature Acclimation Response of the Channel Catfish, *Ictalurus punctatus*
WILLIAM L. SEDDON AND C. LADD PROSSER

45 Respiratory Exchange and Ventilation during Nocturnal Torpor in Hummingbirds
THERESA L. BUCHER AND MARK A. CHAPPELL

53 Body Temperatures and Activity Patterns of Tasmanian Devils (*Sarcophilus harrisii*) and Eastern Quolls (*Dasyurus viverrinus*) through a Subalpine Winter
MENNA E. JONES, GORDON C. GRIGG, AND LYN A. BEARD

61 Glycolytic Enzyme Binding during Entrance to Daily Torpor in Deer Mice (*Peromyscus maniculatus*)
JAMES R. NESTLER, STACY J. PETERSON, B. DAVID SMITH, R. BRIAN HEATHCOCK, CHRISTINA R. JOHANSON, JENNIFER C. SARTHOU, AND JULIANA C. KING

68 Corticosterone, Reproductive Status, and Body Mass in a Cooperative Breeder, the Florida Scrub-Jay (*Aphelocoma coerulescens*)
STEPHAN J. SCHOECH, RONALD L. MUMME, AND JOHN C. WINGFIELD

74 Timing of the Calcium Intake and Effect of Calcium Deficiency on Behaviour and Egg Laying in Captive Great Tits, *Parus major*
JAAP GRAVELAND AND ANITA E. BERENDS

85 Ontogeny of the Thermal Limits in the Harbor Seal (*Phoca vitulina*)
STEPHEN HANSEN AND DAVID M. LAVIGNE

93 Sugar Digestion Efficiencies of Gurney's Sugarbirds, Malachite Sunbirds, and Black Sunbirds
COLLEEN T. DOWNS

100 Respiratory, Acid-Base, and Metabolic Responses of the Christmas Island Blue Crab, *Cardisoma hirtipes* (Dana), during Simulated Environmental Conditions
JOCELYN DELA-CRUZ AND STEPHEN MORRIS

116 The Influence of Habitat and Altitude on Oxygen Uptake in Sub-Antarctic Weevils
STEVEN L. CHOWN, MARIUS VAN DER MERWE, AND VALDON R. SMITH

125 Composition of Fuel Stores and Digestive Limitations to Fuel Deposition Rate in the Long-Distance Migratory Thrush Nightingale, *Luscinia luscinia*
MARCEL KLAASSEN, ÅKE LINDSTRÖM, AND RICHTJE ZIJLSTRA

Number 2

Research Papers

135 The Unusual Adrenergic-Like Excitatory Action of Acetylcholine on the Ventricular Cardiac Muscle of the Horned Shark, *Heterodontus portusjacksoni*
ANTON P. THOMPSON AND JAMES E. O'SHEA

143 Corticosterone and the Stress Response in Young Western Screech-Owls: Effects of Captivity, Gender, and Activity Period
ALFRED M. DUFTY, JR., AND JAMES R. BELTHOFF

150 Seasonal Adjustment of Solar Heat Gain Independent of Coat Coloration in a Desert Mammal
GLENN E. WALSBERG, TODD WEAVER, AND BLAIR O. WOLF

158 Freezing Impairment of Male Reproductive Behaviors of the Freeze-Tolerant Wood Frog, *Rana sylvatica*
JON P. COSTANZO, JASON T. IRWIN, AND RICHARD E. LEE, JR.

167 Effects of Ambient Oxygen Tension on Flight Performance, Metabolism, and Water Loss of the Honeybee
BARBARA JOOS, JOHN R. B. LIGHTON, JON F. HARRISON, RAUL K. SUAREZ, AND STEPHEN P. ROBERTS

175 Effect of Tannins on Galliform Cecal Partitioning
DAVID G. HEWITT, NELSON W. LAFON, AND ROY L. KIRKPATRICK

181 Respiratory, Blood-Gas Transport, and Acid-Base Response of *Leptograpsus variegatus* to Long-Term Immersion and Hyposaline Exposure
ASHLEY R. COOPER AND STEVE MORRIS

193 Mechanical Work as a Determinant of Prey-Handling Behavior in the Tokay Gecko (*Gekko gecko*)
CHRISTINE ANDREWS AND JOHN E. A. BERTRAM

202 Determinants of the Postfeeding Metabolic Response of Burmese Pythons, *Python molurus*
STEPHEN M. SECOR AND JARED DIAMOND

213 Is Diet Shifting Facilitated by Modulation of Intestinal Nutrient Uptake? Test of an Adaptational Hypothesis in Yellow-Rumped Warblers
DANIEL AFIK, BRUCE W. DARKEN, AND WILLIAM H. KARASOV

222 Urea Recycling in Muskrats (*Ondatra zibethicus*): A Potential Nitrogen-Conserving Tactic?
KEVIN L. CAMPBELL AND ROBERT A. MACARTHUR

230 Dietary Lipid and Intestinal Brush Border Membrane Phospholipid Fatty Acid Composition and Glucose Transport of Channel Catfish
KRISTINA L. HOUPE, CHRISTIANE MALO, AND RANDAL K. BUDDINGTON

237 Energetics, Growth, and Body Composition of Adélie Penguin Chicks, *Pygoscelis adeliae*
DONALD N. JANES

244 Ecophysiological Adaptations to Dry Thermal Environments Measured in Two Unrestrained Namibian Scorpions, *Parabuthus villosus* (Buthidae) and *Opisthophthalmus flavescens* (Scorpionidae)
CHRISTOPHER R. BRIDGES, JACOBUS MARTHINUS LE ROUX, AND WILLIE J. VAN AARDT

Number 3

Invited Perspectives in Physiological Zoology

257 Crustacean Endocrinology: A Retrospective, Prospective, and Introspective Analysis
MILTON FINGERMAN

Research Papers

270 Effects of Tannins on Digestion and Detoxification Activity in Gray Squirrels (*Sciurus carolinensis*)
ALICE L. CHUNG-MACCOUBREY, ANN E. HAGERMAN, AND ROY L. KIRKPATRICK

278 The Ratio of Amount of Haemoglobin to Total Surface Area of Erythrocytes in Birds in Relation to Body Mass, Age of Nestlings, and Season of the Year
ALINA KOSTELECKA-MYRCHA

283 Renal Glomerular and Tubular Effects of Antidiuretic Hormone and Two Antidiuretic Hormone Analogues in House Sparrows (*Passer domesticus*)
CINDY S. GOECKE AND DAVID L. GOLDSTEIN

292 The Thermal Biology of Digestion in Rubber Boas (*Charina bottae*): Physiology, Behavior, and Environmental Constraints
MICHAEL E. DORCAS, CHARLES R. PETERSON, AND MARY E. T. FLINT

301 Osmotic Balance in the Eggs of the Turtle *Chelodina rugosa* during Developmental Arrest under Water
ROGER S. SEYMOUR, ROD KENNETT, AND KEITH CHRISTIAN

307 Standard and Maximal Metabolic Rates of Goannas (*Squamata: Varanidae*)
GRAHAM G. THOMPSON AND PHILIP C. WITHERS

324 Dynamics of Brown Fat Thermogenesis in Week-Old Rats: Evidence of Relative Stability during Moderate Cold Exposure
MARK S. BLUMBERG AND GRETA SOKOLOFF

331 Daily Torpor and Energy Expenditure in *Sminthopsis macroura:* Interactions between Food and Water Availability and Temperature
XIAOWEI SONG AND FRITZ GEISER

338 The Effects of Plant and Tooth Structure on Intake and Digestibility in Two Small Mammalian Herbivores
TANIA BEZZOBS AND GORDON SANSON

352 Effects of Thyroid Status on Cold-Adaptive Thermogenesis in Brandt's Vole, *Microtus brandti*
LIU XIAO-TUAN, LI QING-FEN, HUANG CHEN-XI, AND SUN RU-YONG

362 Basal Metabolic Rate in Relation to Body Composition and Daily Energy Expenditure in the Field Vole, *Microtus agrestis*
PETER MEERLO, LOES BOLLE, G. HENK VISSER, DIRKJAN MASMAN, AND SERGE DAAN

370 A Test for Passive Absorption of Glucose in Yellow-Rumped Warblers and Its Ecological Implications
DANIEL AFIK, SCOTT R. MCWILLIAMS, AND WILLIAM H. KARASOV

Number 4

Invited Perspectives in Physiological Zoology

379 Comparative Aspects of Cellular-Volume Regulation in Cardiomyocytes
LEWIS E. DEATON

Research Papers

391 Protein Metabolism, the Costs of Growth, and Genomic Heterozygosity: Experiments with the Mussel *Mytilus galloprovincialis* Lmk.
BRIAN L. BAYNE AND ANTHONY J. S. HAWKINS

403 Thermal Sensitivity of *Drosophila melanogaster:* Evolutionary Responses of Adults and Eggs to Laboratory Natural Selection at Different Temperatures
GEORGE W. GILCHRIST, RAYMOND B. HUEY, AND LINDA PARTRIDGE

415 Evidence for the Involvement of the Crustacean Hyperglycemic Hormone in the Regulation of Lipid Metabolism
EUCLYDES ANTÔNIO SANTOS, LUIZ EDUARDO MAIA NERY, RAINER KELLER, AND ALEX AUGUSTO GONÇALVES

421 Age-Related Changes of Plasma Alkaline Phosphatase and Inorganic Phosphorus, and Late Ossification of the Cranial Roof in the Spanish Imperial Eagle (*Aquila adalberti* C. L. Brehm, 1861)
PABLO M. DOBADO-BERRIOS AND MIGUEL FERRER

428 Ion Regulation in Ion-Poor Acidic Water by the Blackskirt Tetra (*Gymnocorymbus ternetzi*), a Fish Native to the Amazon River
RICHARD J. GONZALEZ, VALERIE M. DALTON, AND MARJORIE L. PATRICK

436 Temperature Effects on the Breeding Distribution of Grey Seals (*Halichoerus grypus*)
STEPHEN HANSEN AND DAVID M. LAVIGNE

444 Autonomic Control of the Pulmonary Surfactant System and Lung Compliance in the Lizard
PHILIP G. WOOD, LUCY K. ANDREW, CHRISTOPHER B. DANIELS, SANDRA ORGEIG, AND CLAIRE T. ROBERTS

456 Energy Requirements of Beavers (*Castor canadensis*) Swimming Underwater
DIRK ALLERS AND BORIS M. CULIK

464 Laboratory Metabolism and Evaporative Water Loss of the Aardwolf, *Proteles cristatus*
M. D. ANDERSON, J. B. WILLIAMS, AND P. R. K. RICHARDSON

470 On the Thermal Capacity of a Bird's Egg Warmed by a Brood Patch
J. SCOTT TURNER

481 Effects of Endurance Training in the Leopard Shark, *Triakis semifasciata*
STEPHEN J. GRUBER AND KATHRYN A. DICKSON

Number 5

Research Papers

493 Effect of Growth Rate and Body Mass on Resting Metabolic Rate in Galliform Chicks
MAURINE W. DIETZ AND RUDI H. DRENT

502 Growth Rate and Maturation of Skeletal Muscles over a Size Range of Galliform Birds
MAURINE W. DIETZ AND ROBERT E. RICKLEFS

511 Influence of Environmental Salinity on Routine Metabolic Rate and Critical Oxygen Tension of *Cyprinodon variegatus*
DENNIS C. HANEY AND FRANK G. NORDLIE

519 Flight-Muscle Polymorphism in the Cricket *Gryllus firmus:* Muscle Characteristics and Their Influence on the Evolution of Flightlessness
ANTHONY J. ZERA, JEFFRY SALL, AND KIMBERLY GRUDZINSKI

530 Gas Permeability of American Alligator Eggs and Its Anatomical Basis
MICHAEL D. KERN AND MARK W. J. FERGUSON

547 Sodium Economy in White-Tailed Deer (*Odocoileus virginianus*)
ERIC C. HELLGREN AND WILLIAM J. PITTS

556 Effects of Arousal from Hibernation and Plasma Androgen Levels on Mating Behavior in the Male Big Brown Bat, *Eptesicus fuscus*
MARY T. MENDONÇA AND WILLIAM A. HOPKINS

563 Epidermal Proteinases in the European Eel
FUTOSHI ARANISHI AND MOTOYUKI NAKANE

571 Inefficiency of Lactation in Primiparous Rats: The Costs of First Reproduction
JOACHIM KÜNKELE AND G. J. KENAGY

578 Sulfide Binding in the Body Fluids of Hydrothermal Vent Alvinellid Polychaetes
PASCALE MARTINEU, S. KIM JUNIPER, CHARLES R. FISHER, AND GARY J. MASSOTH

589 Are Precocial Young Cheaper? Lactation Energetics in the Guinea Pig
JOACHIM KÜNKELE AND FRITZ TRILLMICH

Number 6

Research Papers

597 Phylogenetic Analysis of Thermal Acclimation of the Glycolytic Enzymes in the Genus *Fundulus*
VALERIE A. PIERCE AND DOUGLAS L. CRAWFORD

610 Apparent Absorption Efficiency and Gut Morphometry of Wood Mice, *Apodemus sylvaticus,* from Two Distinct Populations with Different Diets
NADIA CORP, MARTYN L. GORMAN, AND JOHN R. SPEAKMAN

615 Nitrogen and Energy Requirements of the North American Porcupine (*Erethizon dorsatum*)
FRANÇOIS FOURNIER AND DONALD W. THOMAS

621 Ecto-ATPase Activity of Vertebrate Blood Cells
DAVID C. BENCIC, TODD J. YATES, AND ROLF L. INGERMANN

631 Thermal Sensitivity of Growth and Feeding in *Manduca sexta* Caterpillars
JOEL G. KINGSOLVER AND H. ARTHUR WOODS

639 The Influence of Feeding on Oxygen Consumption and Nitrogen Excretion in the Antarctic Nemertean *Parborlasia corrugatus*
ANDREW CLARKE AND ELIZABETH PROTHERO-THOMAS

650 Extracellular Carbonic Anhydrase Activity and Carbonic Anhydrase Inhibitors in the Circulatory System of Fish
RAYMOND P. HENRY, KATHLEEN M. GILMOUR, CHRIS M. WOOD, AND STEVE F. PERRY

660 Low Cost of Locomotion in the Banded Gecko: A Test of the Nocturnality Hypothesis
KELLAR AUTUMN, CLAIRE T. FARLEY, MAYA EMSHWILLER, AND ROBERT J. FULL

670 Cold Tolerance in Hatchling Painted Turtles (*Chrysemys picta*): Supercooling or Tolerance for Freezing?
GARY C. PACKARD, JEFFREY W. LANG, LESLIE D. LOHMILLER, AND MARY J. PACKARD

679 Effect of Body Size and Ration on Specific Dynamic Action in the Antarctic Plunderfish, *Harpagifer antarcticus* Nybelin 1947
SARA J. BOYCE AND ANDREW CLARKE

691 Milk Consumption and Growth in a Marsupial Arboreal Folivore, the Common Ringtail Possum, *Pseudocheirus peregrinus*
SARAH ANN MUNKS AND BRIAN GREEN

701 Conservation of Mass-Specific Metabolic Rate among High- and Low-Elevation Populations of the Acridid Grasshopper *Xanthippus corallipes*
PATRICIA DALY ASHBY

712 Ammonia and Urea in the Maternal-Fetal Trophic Relationship of the Viviparous Blenny (Eelpout) *Zoarces viviparus*
BODIL KORSGAARD

Technical Comment

718 On the Utility of Uniformity in the Definition of Basal Rate of Metabolism
BRIAN K. MCNAB